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# Sisteme Distruite–Tehnologii

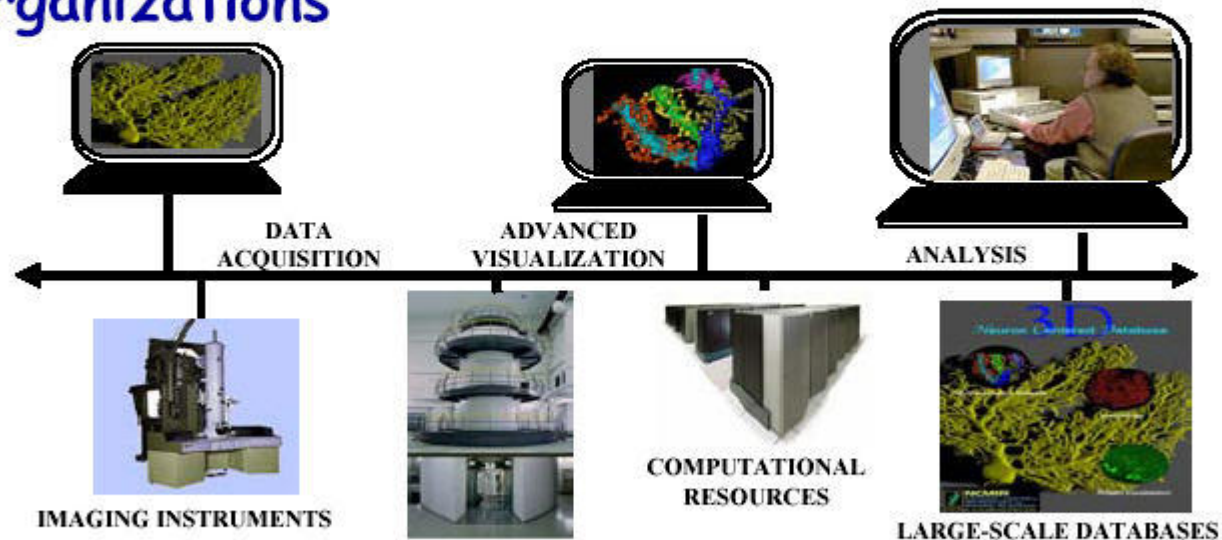
## 3. Grid

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# Grid Computing is About ...

Resource sharing & coordinated problem solving  
in dynamic, multi-institutional virtual  
organizations



"Telescience Grid", Courtesy of Mark Ellisman

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# Definitie

Tip de sistem **distribuit** care permite partajarea, selectia si agregarea unor resurse distribuite geografic:

- ❑ **Calculatoare** – PCuri, statii de lucru, clustere, supercalculatoare, laptopuri, dispozitive mobile, PDA, etc;
- ❑ **Software** – exemplu, inchiriere de aplicatii cu scop special si scumpe, la cerere
- ❑ **Date catalogate si baze de date** – exemplu, acces transparent la baza de date a genomului animal
- ❑ **Instrumente si dispozitive speciale** – exemplu, radio telescop – SETI@Home cautarea vietii in galaxie.
- ❑ **Oameni/colaboratori.**

depinzand de disponibilitatea lor, facilitati, cost si cerinte de calitate a serviciilor impuse de utilizatori

Pentru rezolvarea de probleme/aplicatii pe scara larga

**Astfel permitand crearea de “organizatii virtuale” (VOuri)**

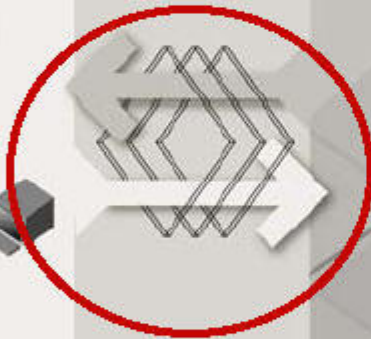
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# The Grid



## PROBLEM SOLVING ENVIRONMENTS

Scientists and engineers using computation to accomplish lab missions



## HARDWARE

Heterogeneous collection of high-performance computer hardware and software resources



## SOFTWARE

Software applications and components for computational problems



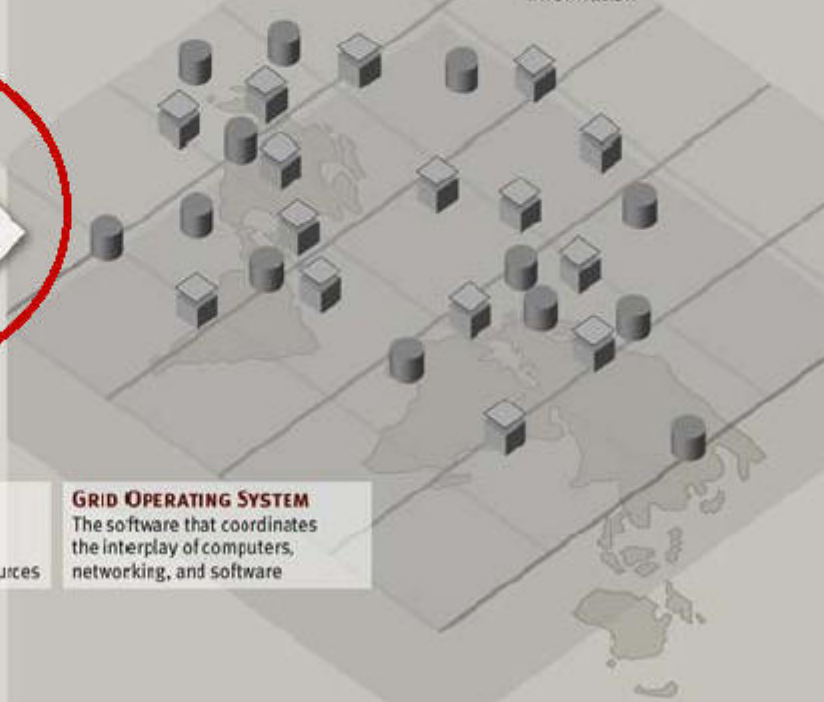
## NETWORKING

The hardware and software that permits communication among distributed users and computer resources



## MASS STORAGE

A collection of devices and software that allow temporary and long-term archival storage of information



## INTELLIGENT INTERFACE

A knowledge-based environment that offers users guidance on complex computing tasks

## MIDDLEWARE

Software tools that enable interaction among users, applications, and system resources

## GRID OPERATING SYSTEM

The software that coordinates the interplay of computers, networking, and software

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# Idea principala a Gridului

- A trata ciclurile de calcul si softwareul ca si produse-marfa
  - Permite utilizarea coordonata a resurselor distribuite geografic - *in absenta controlului central si existenta relatiilor de incredere*
  - Puterea de calcul este produsa ca utilitate precum curentul electric si apei potabile produse pentru consum
  - Utilizatorii au acces la “ouetre” *la cerere*
  - “Cand Reteaua este la fel de rapida ca legaturile interne ale calculatorului, masina se dezagregheaza in Retea intr-o multime de dispozitive cu scop sepcial” – Gilder Technology Report June 2000
-

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# Gridurile de calcul si Gridul de distributie a curentului electric

- **Analogie cu distributia curentului electric**
    - Producatorii de putere: masini, software, retele, sisteme de stocare
    - Consumatori de putere: aplicatii utilizator
  - **Aplicatiile extrag putere din Grid in modalitatea in care dispozitivele extrag electricitate din utilitatea de putere electrica.**
    - Fara efort, Performanta inalta, Peste tot, Dependenta
  - **De ce Gridul de calcul este ca si Gridul de putere electrica**
    - Puterea electrica este peste tot
    - Nu se cunoaste sursa puterii (transformator, generator) sau compania de putere care deserveste
  - **De ce Gridul de calcul este diferit de catre Gridul de putere electrica**
    - Spectru mai lar pentru performanta
    - Spectru mai larg de servicii
    - Aces guvernat de tematiche mai complicate precum securitatea si performanta
-

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Alessandro Volta in Paris in 1801 inside French National Institute shows the battery while in the presence of Napoleon I



Fresco by N. Cianfanelli (1841)  
(Zoological Section "La Specula" of National History Museum of Florence University)

---



Oh, mon  
Dieu !

What ?!?!  
This is a mad man...

...and in the future,  
I imagine a  
Worldwide  
Power (Electrical)  
Grid .....





2002 - 1801 = 201 Years

1801



2002



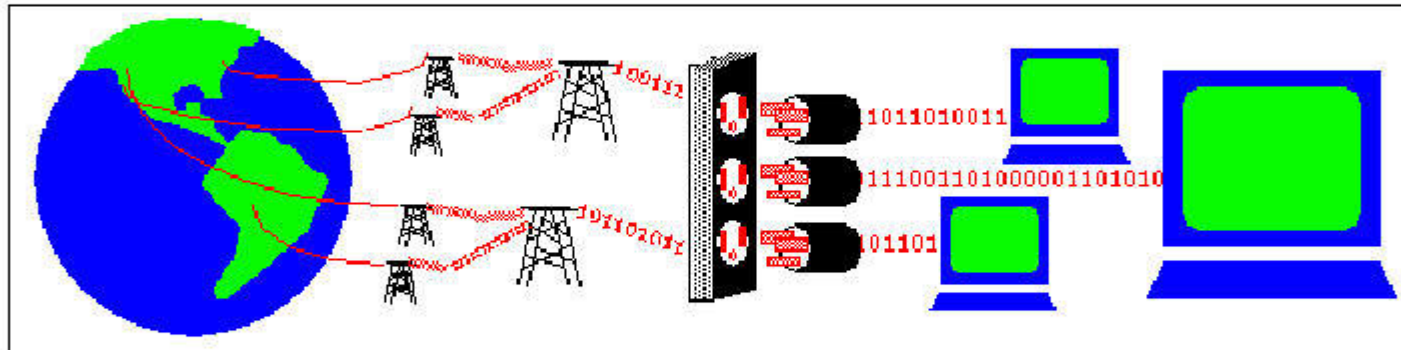


# IPG: Analogy to Electric Power Grid



Principal benefits:

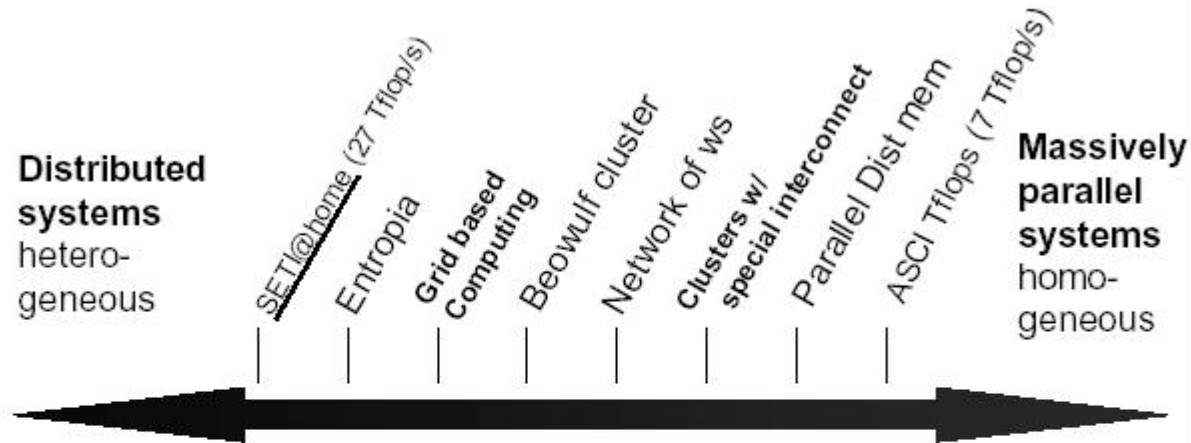
- load sharing/balancing
- fault tolerance, minimum loss-of-service
- economies of scale



Principal risks/challenges:

- possible fault domino effect
- reliance on facilities under other's control
- negotiation of agreements
- standards development and compliance policing

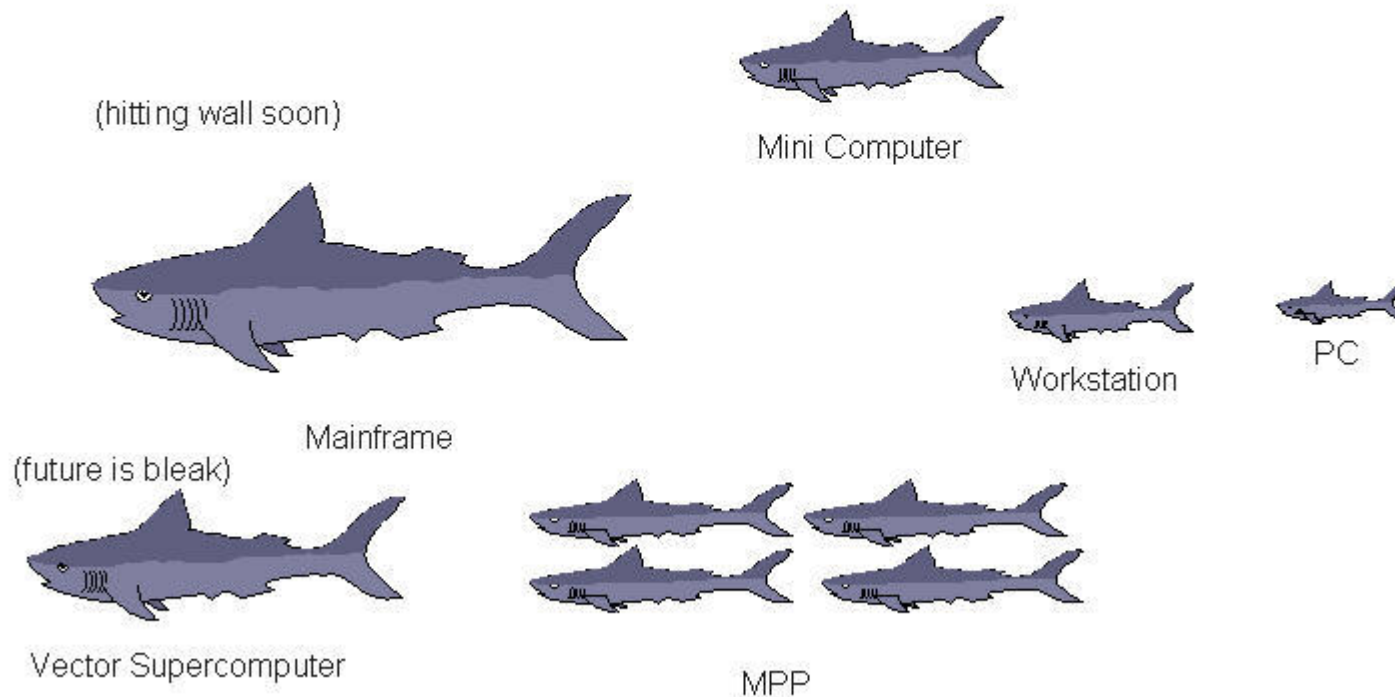
# Distributed and Parallel Systems



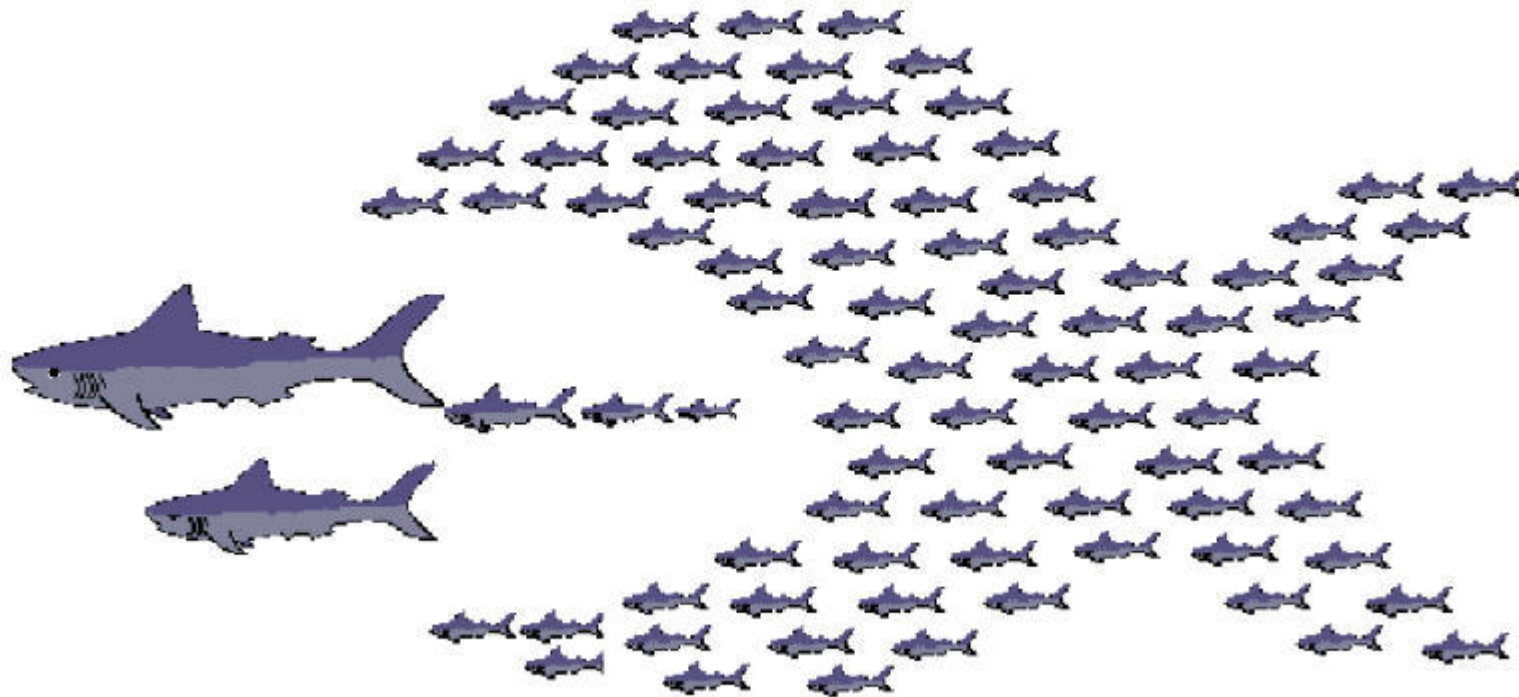
- Gather (unused) resources
- Steal cycles
- System SW manages resources
- System SW adds value
- 10% - 20% overhead is OK
- Resources drive applications
- Time to completion is not critical
- Time-shared

- Bounded set of resources
- Apps grow to consume all cycles
- Application manages resources
- System SW gets in the way
- 5% overhead is maximum
- Apps drive purchase of equipment
- Real-time constraints
- Space-shared

# Early 1990 Computer Food Chain



# Replacing Big Irons





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## P2P, Cluster, Calcul pe Internet vs. Calcul pe Grid

- ***Rețelele Peer-to-peer*** (ex. Kazaa) intra in categoria calculului pe Grid
    - Resursa partajata este capacitatea de stocare a fiecarui nod
    - Un grup de lucru P2P face parte din Global Grid Forum (GGF)
  - Un ***cluster*** este o resursa care poate fi partajata
    - Un Grid este un cluster de cluster
  - ***Internet computing:***
    - Un VO este constituit pentru un proiect particular si dezactivat odata ce proiectul este complet
    - Resursa partajata este calculatorul conectat la Internet
-

# Evolutia Gridului: prima generatie

## Grid Evolution - Metacomputing



### □ Different Supercomputing Resources

- ❖ geographically distributed
- ❖ used as a single **powerful** parallel machine (clear, High-Performance orientation)

## Metacomputing

□ The word metacomputing was coined to describe this new computational approach

California Institute for Telecommunications and Information Technology

□ Reference:

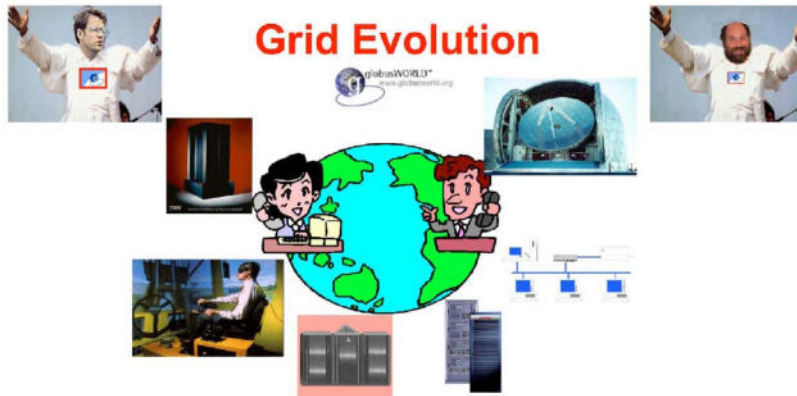
□ Larry Smarr & Charles E. Catlett

□ **Metacomputing**

❖ Communications of the ACM, 35(6):45-52, June 1992



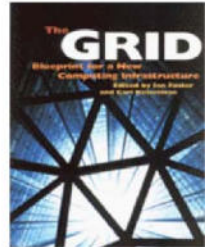
# Evolutia Gridului: a doua generatie



Grid computing has emerged as an important new field, distinguished from conventional distributed computing by its focus on large-scale resource sharing, innovative applications, and, in some cases, high-performance orientation.

## Grid Applications

- ❑ **Distributed Supercomputing**
  - ❖ Stellar Dynamics, Ab initio chemistry, ...
- ❑ **High Throughput**
  - ❖ Chip design, Parametric studies, ...
- ❑ **On Demand**
  - ❖ Medical instrumentation, network-enabled solvers, .....
- ❑ **Data Intensive**
  - ❖ Sky survey, Physics data, Data Mining, .....
- ❑ **Collaborative**
  - ❖ Collaborative design, data exploration, education, ...



# Evolutia Gridului: a treia generatie

## Grid Evolution



The marriage of the **Web technology** with the **2nd Generation Grid technology** led to new and generic Grid Services

## The Physiology of the Grid

An Open Grid Services Architecture for Distributed Systems Integration  
I. Foster, C. Kesselman, J. Nick, S. Tuecke, January, 2002



<http://www.globus.org/research/papers/ogsa.pdf>

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# Servicii OGSA

- Open Grid Service Architecture,
    - Definit de grupul GGF
    - In platforma Grid sunt necesare anumite interferente, comportari, modele de resurse si legaturi
    - Defineste multimea de baza de servicii esentiale pentru Grid, functionalitatea lor si relatiile intre ele
    - Serviciile de baza: interactiunea, administrarea, comunicarea si securitatea
    - Servicii suplimentare: date, executii de programe, administrarea resurselor
  - Serviciul Grid este un serviciu Web cu extensii, printre care:
    - Nume (handle - GSH, reference - GSR)
    - Managementul ciclului de viata a serviciului (servicii fabrica, persistente si tranziente)
    - Stare (Service Data)
    - Notificare si interogare
-



# CoreGrid Definition of GRID

Core **GRID**

A fully distributed,  
dynamically reconfigurable,  
scalable and autonomous  
infrastructure to provide  
location independent,  
pervasive, reliable,  
secure and efficient  
access

Core **GRID**

to a coordinated set of  
services encapsulating and  
virtualizing resources  
(computing power, storage,  
instruments, data, etc.)  
in order to generate  
knowledge.

2006

# Middleware de facto: Globus Toolkit



## Globus: Milestones

- ❑ Start-up: **1996**
- ❑ GT1.0: 1998
- ❑ GT2.0: 2001
- ❑ GT3/T.Preview: Apr-Dec 2002
- ❑ GT3.0 Alpha: Jan 2003
- ❑ GT3 Production: June 2003
- ❑ GT3.9.2 August 2004 **α-quality**
- ❑ GT3.9.2 December 2004 **β-quality**
- ❑ GT4.0 January 2005 **Stable Release**

**2<sup>nd</sup>**

**3<sup>rd</sup>**

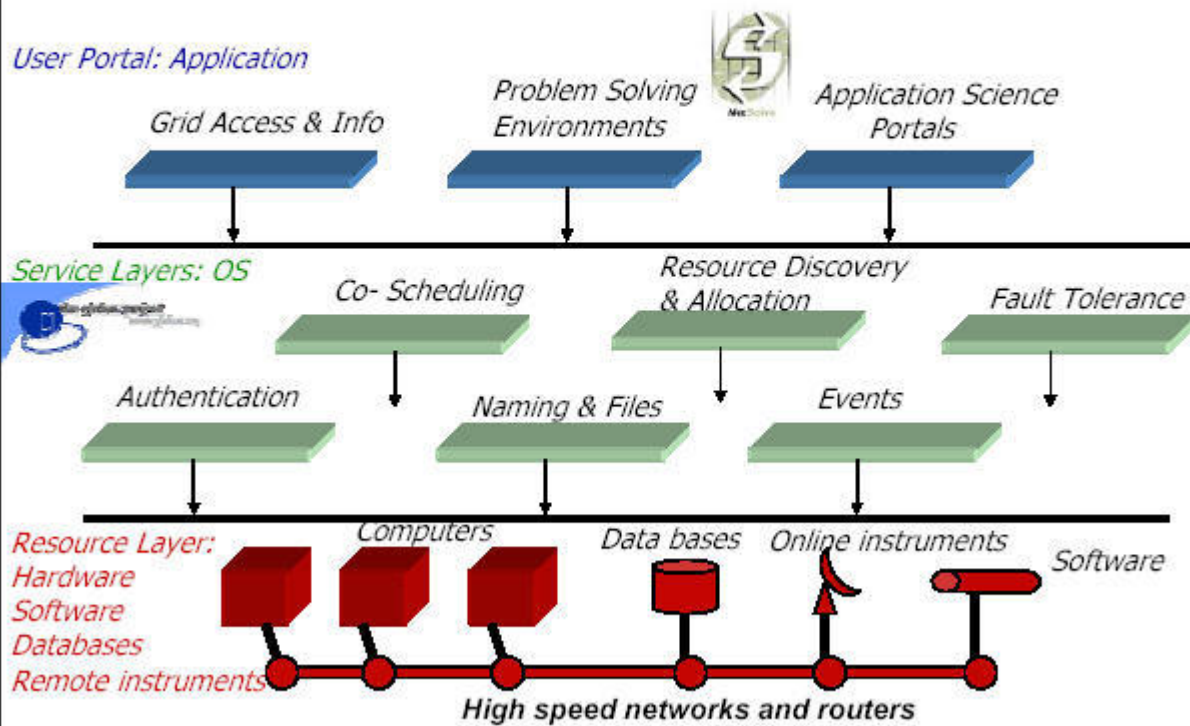


**9 YEARS..**



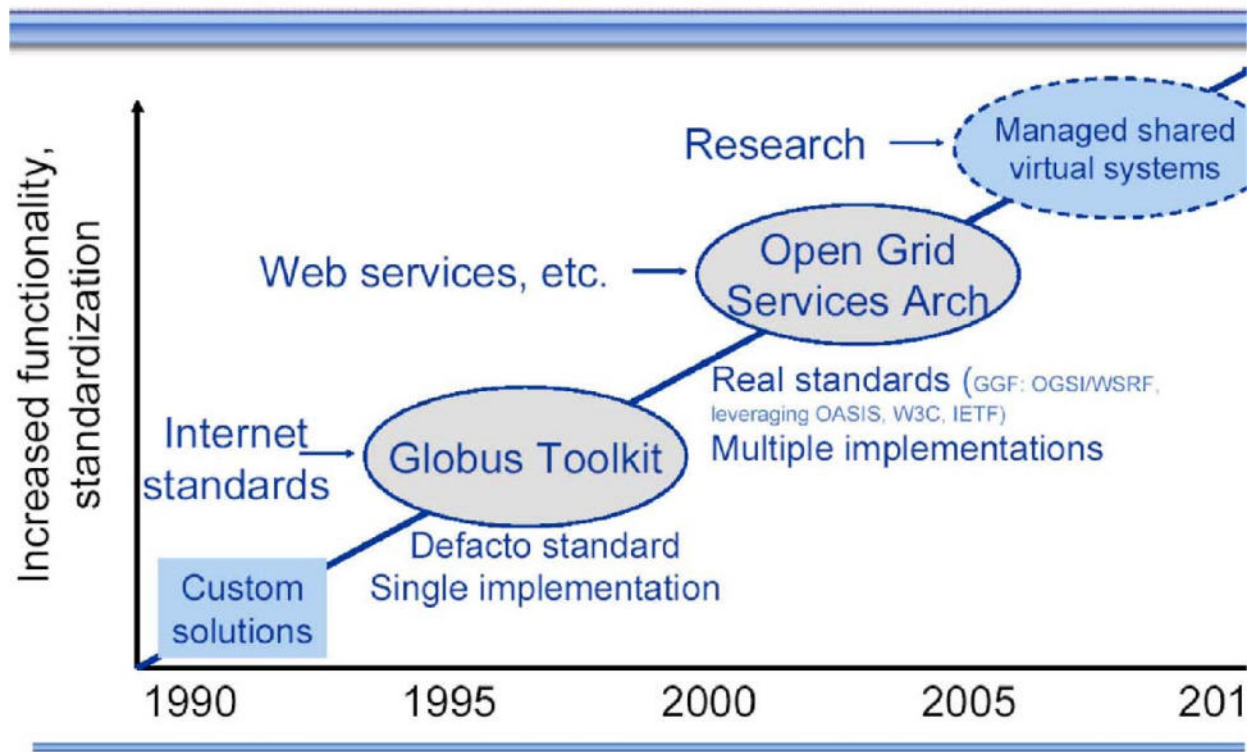


# The Grid Architecture Picture



# Viitorul?

## Developing Grid Standards



Source: Ian Foster - foster@mcs.anl.gov

From the source..

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# Ce vor utilizatorii ?

## ■ Consumatorii de Grid

- ❑ Sa execute joburi pentru rezolvarea de probleme cu marimi si complexitate variabile
- ❑ Sa beneficieze de selectarea si agregarea resurselor intr-o varianta inteleapta
- ❑ Sa poata negocia timpul si costul

## ■ Distribuitorii de Grid

- ❑ Sa contribuie cu resurse (“ne-ocupate”) pentru executia de jocuri ale consumatorilor
  - ❑ Sa beneficieze prin maximizarea utilizarii resurselor
  - ❑ Sa poata negocia intre cerintele locale si oportunitatile pietei
-

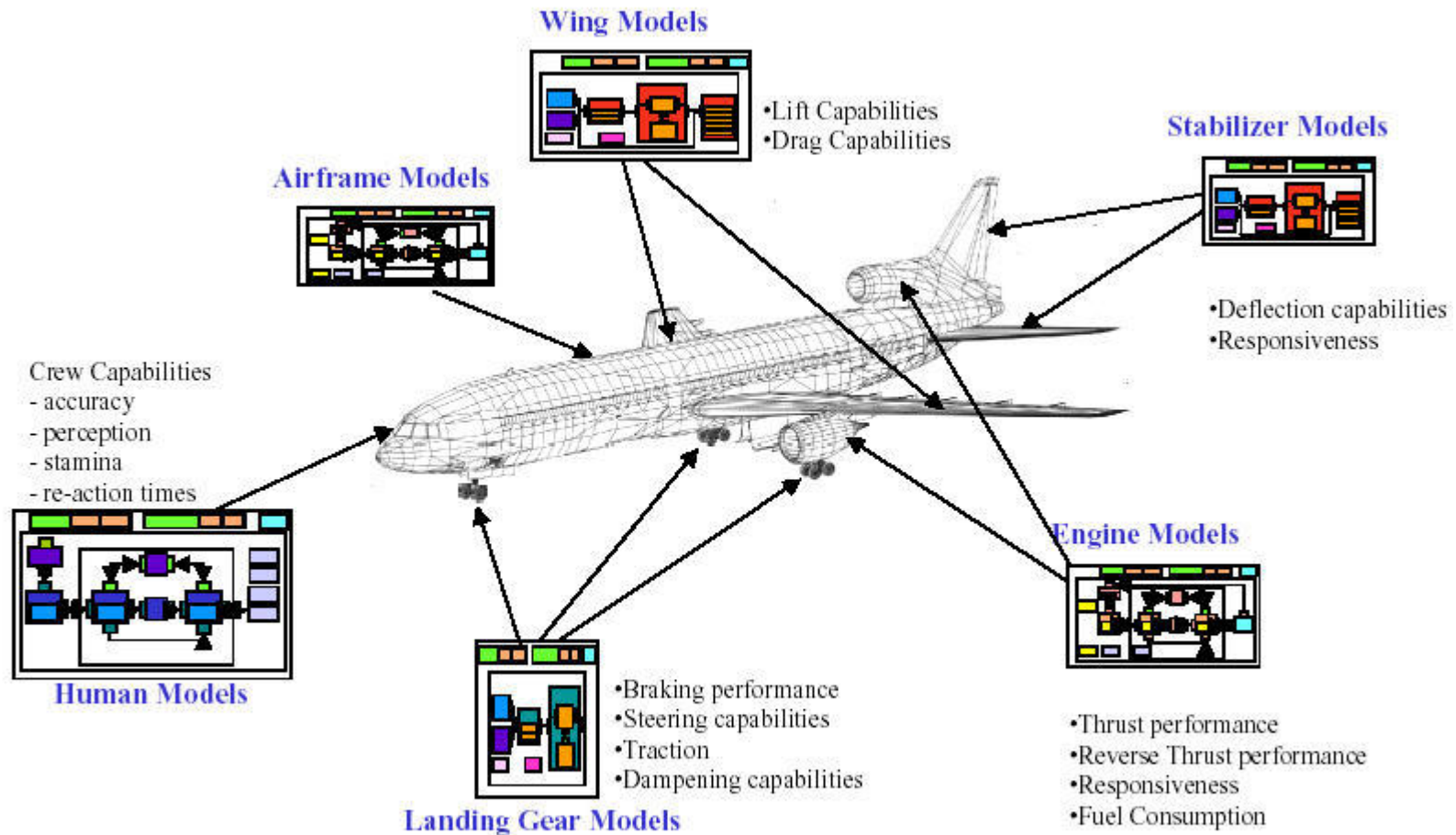


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# Aplicatii ale Gridului

- **HPC distribuit (supercalcul):**
    - Stiinta computationala
  - **Calcul la capacitate/patrundere inalta**
    - Studii parametrice, design chipuri, simulari pe scara larga
  - **Partajare de continut (liber sau platit)**
    - Partajarea de continut digital intre semeni (ex., Napster)
  - **Acces la software la distanta/inchiriere servicii**
    - Application service provider (ASPs) & servicii Web
  - **Calcul intensiv in date**
    - Design medicamente, fizica particulelor, predictii de stoc...
  - **Calcul la cerere, in timp real**
    - Instrumentare medicala & Misiuni critice
  - **Calcul colaborativ:**
    - Design colaborativ, explorarea datelor, educatie
  - **Calcul orientat spre servicii (SOC):**
    - Inspre calcul utilitar bazat pe economie: aplicatii si business nou
-

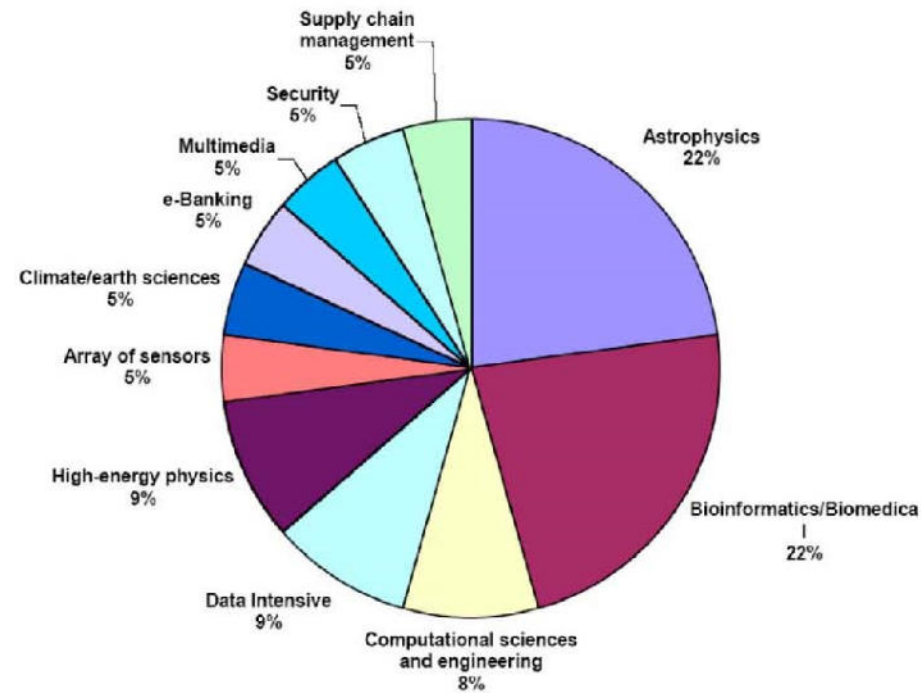
# Multi-disciplinary Simulations



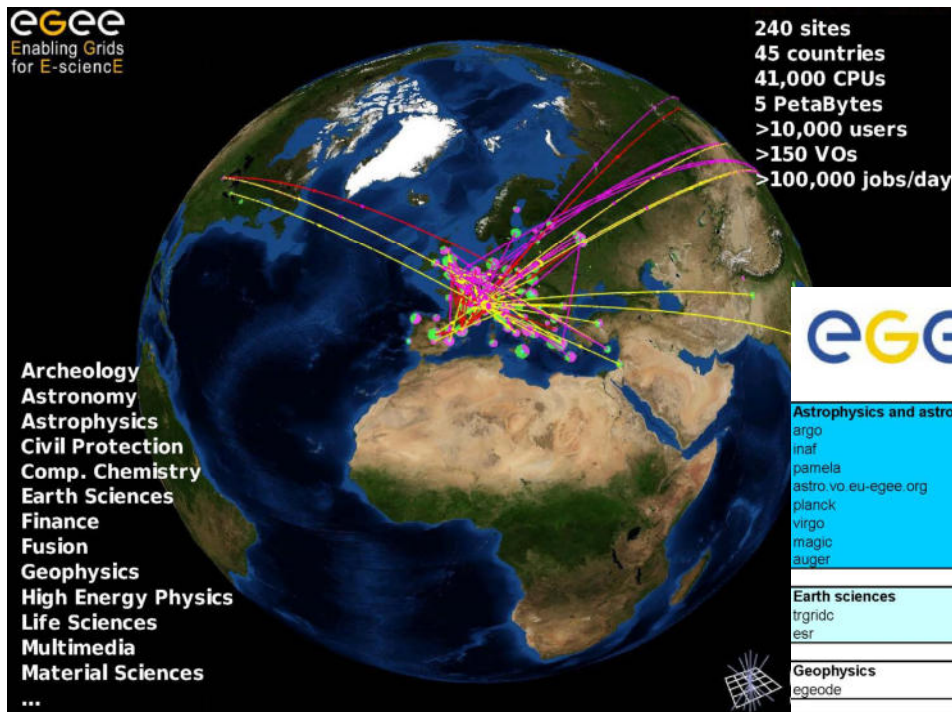
*Whole system simulations are produced by coupling all of the sub-system simulations*

# Statistici GridCoord

## *Applications by Topic*



# EGEE – cel mai mare Grid European & LHC



Enabling Grids for E-scienceE

## Disciplines and users

### Astrophysics and astroparticle physics

argo  
inaf  
pamela  
astro.vo.eu-egee.org  
planck  
virgo  
magic  
auger

### Earth sciences

trgridc  
esr

### Geophysics

egeode

### Finance

egrid

### Fusion

fusion

### Biomedical and bioinformatics information

libi  
bio  
biomed  
embrace

### High Energy Physics

calice  
hone  
ific  
ildg  
minos.vo.gridpp.ac.uk  
pheno  
supernemo.vo.eu-egee.org  
vo.lal.in2p3.fr  
vo.llr.in2p3.fr  
vo.lpnhe.in2p3.fr  
vo.sbg.in2p3.fr  
hermes  
vo.dapnia cea.fr  
alice  
atlas  
babar  
belle  
cdf  
cms  
dzero  
gridpp  
ilc  
lhcb  
na48  
zeus  
ghep  
desy

### Computational chemistry

enmr.eu  
trgrida  
compchem  
gaussian

### Infrastructure

edteam  
euindia  
ops  
pvier  
rdteam  
rgstest  
swetest  
vo.deploymenttest cea.fr  
vo.e-ca.es  
vo.grif.fr  
infgrid  
eela  
eumed  
dteam  
vo.plgrid.pl  
balticgrid  
dech  
see  
seegrid  
twgrid  
trgrida/b/c/d/e  
voce

### Others

aegis  
apesci  
astron  
cesga  
enea  
grid-it  
gridmosi.ici.ro  
lights.infn.it  
ncf  
vo.agata.org  
vo.ipno.in2p3.fr  
vo.northgrid.ac.uk  
webcom  
geant4  
imath.cesga.es  
proactive  
cosmo  
crypto.swing-grid.ch  
diligent  
cyclops  
geclipse  
gridcc

~8000 users  
listed in  
registered  
VOs

Digital libraries, disaster  
recovery, computational  
sciences, etc.

<http://cic.gridops.org/index.php?section=home&page=volist> or visit CIC portal demo



# Utilizare EGEE

## EGEE NEWS RELEASE

Embargoed until 4 May 2006, 18:00 CCT (10:00 GMT, 12:00 MEST)

### EGEE GRID ATTACKS AVIAN FLU

During April, a collaboration of Asian and European laboratories has analysed 300,000 possible drug components against the avian flu virus H5N1 using the EGEE Grid infrastructure. The goal was to find potential compounds that can inhibit the activities of an enzyme on the surface of the influenza virus, the so-called neuraminidase, subtype N1. Using the Grid to identify the most promising leads for biological tests could speed up the development process for drugs against the influenza virus.

One of the targets of existing drugs today on the market is viral neuraminidase, an enzyme that helps the virus to proliferate and infect more cells. As this protein is known to evolve into variants if it comes under drug stress, drug resistance becomes a potential concern in case of an influenza pandemic.

## EGEE Users and resources distribution

Enabling Grids for E-science



EGEE-II INFISO-RI-03 1688

Bob Jones - EGEE User Forum, 11-14 February 2008

11

Links

Multimedia

Policy of view

What is the Grid? | How it works | What it can do | A brief history | The Grid and you | Grid @ CERN | Grid projects worldwide

What is grid computing?

**The short answer...**

The short answer is this: **grid computing is a service for sharing computer power and data storage capacity over the Internet.** Grid computing is making big contributions to scientific research, helping scientists around the world to analyze and store massive amounts of data.

The **grid computing dream** began with talk of creating an all-powerful "Grid": one grid comprised of many smaller grids joined together, forming a global network of computers that can operate as one vast computational resource.

In **grid computing reality**, there are already hundreds of grids around the world, each one created to help a specific group of researchers, or a particular group of users. And across the world, researchers and software engineers are working to bring "the Grid" closer to achieving the dream.

**WANT THE LONG ANSWER?** Take a walk through the rest of this website! Find out [how grid computing works](#), [what grid computing can do](#), [what it could mean for you](#), and much more...

**How is grid computing different from the World Wide Web?** Simple. Grid computing allows computers to share power over the Internet, while the Web allows them to share information over the Internet.

Grid computing is more than just communicating between computers: it is a way to share computing power.

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**ISGTW INTERNATIONAL SCIENCE GRID THIS WEEK**

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Home > [ISGTW 12 September 2008](#) > ISGTW Editorial - Beam Day

Editorial - Beam Day

Today, after more than a decade of meticulous preparation in the high-energy physics world—in theoretical frameworks, detector research and development, site construction, data simulations, analysis software, distributed computing infrastructures, networks and more—CERN's Large Hadron Collider proton beam turns on and will begin circulating through its entire 27-km length.

**International Science Grid** This Week congratulates the scientists, engineers, technicians, software developers, managers, coordinators, students, secretaries and all the other hard-working, talented and dedicated participants whose effort made this happen. The sheer volume of data that the LHC experiments will need to process became the driving force for developing the World-wide LHC Grid (WLCG), and hence Enabling Grids for E-Science (EGEE) in Europe and Open Science Grid in the United States. ISGTW celebrates with them, and thanks them, as this publication is an offspring of that collaboration.

Simulation of the detection of a Higgs Boson.  
(Image courtesy of CERN)

**In the beginning**

OSG—the primary grid computing infrastructure for US-based scientists in CMS and ATLAS—started *Science Grid This Week*, with Katie Nukiewicz as editor, to feature grid-enabled science achievements in America. EGEE teamed up a year later, and *International Science Grid This Week* was born. After a time, Katie moved on and Danielle Venton took over as editor, followed by the arrival of Cristy Burns. As Cristy moved to GridTalk, Dan Drollette and Arne Heavy came on board as European and American co-editors, respectively.

ISGTW strives to balance coverage of grid-related research from around the globe, from physics, chemistry and biology to storm prediction and ancient literature. LHC news is just one part of all the grid-related news in this publication, but we continue to recognize the LHC as the driving force in enabling other research to benefit from the power of grid computing.

To acknowledge this significant event, we feature a special LHC section for the next few weeks, at the top of the right vertical column, where you can easily find past LHC-related coverage from our publication.

**21 October 2008**  
LHC INNOVATION  
LHC coverage in ISGTW

**16 OCTOBER 2008**

[Feature - Computational physics increases grid success rates](#)  
[Feature - Tracking malaria vaccines](#)  
[Question - Searching for the sub-atomic](#)  
[Link - LHC Innovation](#)  
[Image - CMS](#)

**Announcement**

[Call for tutorials, HPC, Boulder Colorado](#)  
[Abstracts deadline, 30 Nov, Teracon Conference](#)  
[Workshop 27-31 Oct, Budapest](#)  
[Jobs in grid this week](#)

[Mark your calendar](#)

October 2008

[13-15, 8th Croatian Grid Workshop, Krakow, Poland](#)  
[16-17, Cyberinfrastructures and Applications, Yucatan, Italy](#)  
[18-24, Grid Camp and HPCX Fall 2008 Meeting, Tsinghua](#)



# RO in EGEE, SEE-Grid & alte Griduri

No	Site Reports	GIIS Host	bnode	cernse	qperf	sanity	serv	serEntry	version	sclust	totalCPU	freeCPU	runJob	waitJob	seAvail TB	seUsed TB	maxCPU	avgCPU	DI	alice
1	<a href="#">AEGIS01-PHY-SCL</a>	ce.phy.bg.ac.yu	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.6	826	2	824	3927	25.06	0.01	826	627	ok	ok
2	<a href="#">AEGIS02-RCUR</a>	grid01.rcub.bg.ac.yu	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	12	2	7	0	0.04	0.01	12	11	ok	ok
3	<a href="#">AEGIS03-ELEF-LEDA</a>	grid01.elfak.ni.ac.yu	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.8	4	3	0	0	0.00	0.00	4	3	ok	ok
4	<a href="#">AEGIS04-KG</a>	cluster1.csk.kg.ac.yu	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	42	14	10	0	0.85	0.00	42	41	ok	ok
5	<a href="#">AEGIS05-ETFBG</a>	rti29.etf.bg.ac.yu	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.8	28	25	0	10	0.03	0.00	28	27	ok	ok
6	<a href="#">AEGIS06-AOB</a>	grid01.aob.bg.ac.yu	ok	ok	ok	error	ok	ok	na	na							0	0	ok	ok
7	<a href="#">AL-01-INIMA</a>	prof.salla6.inima.al	ok	ok	ok	error	ok	ok	na	na							0	0	ok	ok
8	<a href="#">AL-02-FIE</a>	seegrid2.fie.upt.al	ok	ok	ok	error	ok	ok	na	na							0	0	ok	ok
9	<a href="#">AM-01-IIAP-NAS-RA</a>	ce.seegridtest.sci.am	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	ScientificSL 4.5	2	1	1	1	0	0	2	1	ok	ok
10	<a href="#">BA-01-ETFBG</a>	ce01.grid.etfbl.net	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.8	10	0	12	1	0.49	0.00	10	9	ok	ok
11	<a href="#">BA-02-ETFIS</a>	g01.etf.unssa.rs.ba	ok	ok	ok	ok	ok	ok	na	na	12	12	0	54	0.04	0.01	12	11	ok	ok
12	<a href="#">BA-03-ETFSA</a>	n00.grid.etf.unsa.ba	ok	ok	ok	error	ok	ok	na	na							0	0	ok	ok
13	<a href="#">BA-04-PMFSA</a>	ce.grid.pmf.unsa.ba	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	16	2	4	3	0.07	0.00	19	16	ok	ok
14	<a href="#">BG01-IPP</a>	ce002.ipp.acad.bg	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	22	17	5	50	0.82	0.08	22	15	ok	ok
15	<a href="#">BG02-IM</a>	ce001.imbm.bas.bg	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	21	11	8	11	0.01	0.04	21	20	ok	info
16	<a href="#">BG04-ACAD</a>	ce02.grid.acad.bg	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	80	9	71	27	1.59	0.06	80	76	ok	ok
17	<a href="#">BG05-SUGrid</a>	ce001.grid.uni-sofia.bg	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificCERNSLC 4.5	22	4	3	56	0.02	0.05	24	22	ok	ok
18	<a href="#">BG06-FMI</a>	ce001.fmi.uni-sofia.bg	ok	ok	ok	error	ok	ok	na	na							3	2	ok	ok
19	<a href="#">HG-01-GRNET</a>	ce01.isabella.grnet.gr	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.3	64	2	51	20	1.50	3.28	64	63	ok	ok
20	<a href="#">HG-03-AUTH</a>	ce01.afroditi.hellasgrid.gr	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.9	120	3	94	57	1.24	1.88	120	118	ok	info
21	<a href="#">HR-01-RBI</a>	grid1.irb.hr	ok	ok	ok	ok	ok	ok	GLITE-3 0 0	Debian 4.0	18	5	3	2	0.06	0.00	18	18	ok	ok
22	<a href="#">MD-01-TUM</a>	ce01.grid.renam.md	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	1	2	0	65	0	0	1	0	ok	ok
23	<a href="#">MK-01-UKIM II</a>	grid-ce.ii.edu.mk	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	4	7	7	39	1.05	0.05	4	3	er	info
24	<a href="#">MK-02-ETE</a>	grid-ce.feit.ukim.edu.mk	ok	ok	ok	ok	ok	ok	GLITE-3 0 2	Scientific Linux 3.0.9	12	18	6	0	0.95	0.00	12	12	ok	ok
25	<a href="#">MREN-01-CIS</a>	grid01.cg.ac.yu	ok	ok	ok	error	ok	ok	na	na							12	7	ok	ok
26	<a href="#">RO-01-ICI</a>	testbed002.grid.ici.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	CentOS 4.6	12	0	11	42	0.32	0.00	12	8	ok	ok
27	<a href="#">RO-03-UPB</a>	gw01.seegrid.grid.pub.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificCERNSLC 4.6	32	62	3	0	0.27	0.01	34	26	ok	ok
28	<a href="#">RO-07-NIPNE</a>	tbit01.nipne.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificCERNSLC 4.6	356	69	230	79	3073.40	1.47	356	335	ok	ok
29	<a href="#">RO-08-UVT</a>	ce01.grid.info.uvt.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificCERNSLC 4.6	28	19	8	0	0.89	0	28	18	sd	ok
30	<a href="#">RO-09-UTCN</a>	ce01.mosigrd.utcluj.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	18	18	0	1333332	0.21	0.01	20	18	ok	ok
31	<a href="#">RO-10-TUIASI</a>	ce.grid.tuiasi.ro	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	Scientific Linux 3.0.8	1	1	0	10	0.03	0.00	1	0	ok	ok
32	<a href="#">SZTAKI</a>	n31.hpcc.sztaki.hu	ok	ok	ok	warn	ok	ok	GLITE-3 1 0	ScientificSL 4.5	2	16	0	0	0.18	0	16	5	ok	ok
33	<a href="#">TR-01-ULAKBIM</a>	ce.ulakbim.gov.tr	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	66	60	6	0	1.35	2.09	67	64	ok	ok
34	<a href="#">TR-03-METU</a>	cox01.grid.metu.edu.tr	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	60	13	88	44	8.43	3.09	300	298	ok	ok
35	<a href="#">TR-05-BOUN</a>	yildirim.grid.boun.edu.tr	ok	ok	ok	ok	ok	ok	GLITE-3 1 0	ScientificSL 4.5	300	4	40	8	0.58	0.13	60	60	ok	ok

Traininguri regulate la UVT: SEE-Grid-SCI, EGEE-3 si GiSHEO

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# Cerinte ale Gridului

- Identitate & autentificare
  - Autorizare & politici
  - Descoperirea resurselor
  - Caracterizarea resurselor
  - Alocarea resurselor
  - (Co-)rezervarea, workflow
  - Algoritmi distribuiti
  - Acces la date la distanta
  - Transfer de date la viteze mari
  - Garantii de performanta
  - Adaptarea monitorizarii
  - Detectarea intrusilor
  - Managementul de resurse
  - Conturi & plati
  - Managementul esecurilor
  - Evolutia sistemului
  - Etc.
-

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## Cateva cerinte ale Gridului – Perspectiva utilizatorului

- O singura modalitate de alocare
  - O singura intrare (sign-on): autentificarea la orice resursa a Gridului duce la autentificarea la toate celelalte
  - Un singur spatiu de calcul: un singur planificator pentru toate resursele Grid
  - Un singur spatiu de date: poate adresa fisiere si date de la orice resursa a Gridului
  - Un singur mediu de dezvoltare: unelte si biblioteci Grid care lucreaza ca toate resursele Grid
-

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# Problema securitatii

- Resursele utilizate pot fi extrem de valoroase si problemele alocarii pot fi extrem de sensibile
  - Resursele sunt adesea localizate in domenii administrative distincte
    - Fiecare resursa poate sa aiba propriile politici si proceduri
    - Multimea de resurse utilizare la un singur calcul poate fi mare, dinamic si/sau imprevizibil
    - Nu numai client/server
  - Pot fi disponibile si aplicabile pe scara larga
    - Standard, bine-testate, protocoale bine intelese
    - Integrarea cu o varietate mare de unelte
-

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# Problema administrarii resurselor

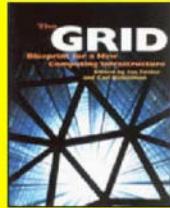
Permiterea accesului securizat, control la distanta a resurselor de calcul si administrarea calculelor de distanta

- Autentificare si autorizare
  - Descoperirea si caracterizarea resurselor
  - Rezervarea si alocarea
  - Monitorizarea si controlul calculului
-



# Conclusions

The idea that each species has been independently created is erroneous



## FUTURE WATCH Ubiquitous computing

Technical advances in bandwidth, routing, and backbone technologies promise to dramatically change the shape and focus of the Internet, opening up new b-to-b and b-to-c communication and sales channels for businesses, increase choice for consumers, and reduce bandwidth bottlenecks. On the downside, it will raise privacy and intellectual property rights issues. Ubiquitous computing will become viable in five to 10 years.



### Utility Computing

UtilityComputing.com    OnDemandComputing.com

08 August 2003



As I understand the business drivers behind the growing trend of Utility Computing:

- Learn what the major vendors are offering. What are their offerings and who is most positioned for success?
- What does Utility Computing mean for IT?
- What does Utility Computing mean for a Small Business?
- What does Utility Computing mean for a Small Company who has the need to grow?

*"The North American IT utility (computing) market is to grow to \$4.6 billion by 2007"*  
— The Kautman Group

More information at [UtilityComputing.com](http://UtilityComputing.com)

## The Vision of Autonomic Computing

Systems manage themselves according to an administrator's goals. New components integrate as effortlessly as a new cell establishes itself in the human body. These ideas are not science fiction, but elements of the grand challenge to create self-managing computing systems.



Information Society  
Technologies



### NEWSLETTER

The "Disappearing Computer II" Proactive initiative

18 February 2003

Convergence is a need !

